

IN THE CLAIMS

Claim 1 (withdrawn) A fibre-reinforced plastic structure with a hollow section which is characterized in that

(A) it is a fibre-reinforced plastic structure with a hollow section which is provided with at least one opening and with a main body portion having in the interior a cavity of maximum width greater than the maximum width of the aforesaid opening(s),

(B) the aforesaid main body portion is composed of fibre-reinforced plastic where reinforcing fibre has been impregnated with synthetic resin and, furthermore,

(C) the aforesaid main body portion has a solid of non-revolution shape where the interior maximum width (F) of the cavity is at least 0.5 m and the ratio (F/f) of the interior maximum width (F) of the cavity to the maximum width (f) of the aforesaid opening(s) lies in the range 1.1 to 500, and

(D) furthermore, the aforesaid main body portion is formed as an integral construction in which its totality substantially has no regions which are joined.

Claim 2 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 1 which is characterized in that, at the inner circumferential face of the aforesaid main body portion, there is a projecting rib which projects in the radial direction thereof.

Claim 3 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 2 which is characterized in that the aforesaid projecting rib has a frame structure with a core material present in the interior and, furthermore, with the periphery of the core material enveloped by a skin layer containing reinforcing fibre.

Claim 4 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 3 which is characterized in that, in the fibre-reinforced plastic of the aforesaid main body portion, there are substantially no reinforcing fibres extending continuously over two or more laps in the circumferential direction.

Claim 5 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 4 which is characterized in that a closed space is formed in the main body portion.

Claim 6 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 5 which is characterized in that, as well as the section in the aforesaid circumferential direction forming a closed space, a portion formed as an integral construction substantially having no joined regions is positioned at the end or at a central region of the aforesaid main body portion.

Claim 7 (withdrawn) A fibre-reinforced plastic structure with a hollow section which is characterized in that

(A) it is composed of a plurality of moulded elements,

(B) at least one of these moulded elements is a structure which is provided with at least one opening and with a main body portion having a cavity in the interior and, furthermore, the section thereof has a solid of non-revolution shape,

(C) the aforesaid main body portion is composed of fibre-reinforced plastic where the reinforcing fibre has been impregnated with synthetic resin and, furthermore,

(D) the aforesaid main body portion has in at least one location a portion forming a closed space in the circumferential direction section and which is formed as an integral construction substantially having no joined regions.

Claim 8 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 7 which is characterized in that the aforesaid opening is positioned at an end portion of the structure comprising a plurality of moulded elements.

Claim 9 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 7 or Claim 8 which is characterized in that, in the aforesaid structure, the interior maximum width (F) of the cavity is at least 0.51 m and the ratio (F/f) of the internal maximum width (F) of the cavity to the maximum width (f) of the aforesaid opening lies in the range 1.1 to 500.

Claim 10 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 9 which is characterized in that at the inner surface facing the cavity of the aforesaid structure, there is a rib projecting in the radial direction thereof.

Claim 11 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 10 which is characterized in that the aforesaid projecting rib has a frame

structure with a core material present in the interior and the periphery thereof enveloped by a skin layer containing reinforcing fibre.

Claim 12 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 11 which is characterized in that the main body portion of the aforesaid structure is formed with a shell comprising aforesaid skin layer positioned on the outside and core material positioned on the inside.

Claim 13 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 12 which is characterized in that the aforesaid structure is formed with a shell where skin layer comprising fibre-reinforced plastic is further laminated on the inside of the aforesaid core material.

Claim 14 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claims 12 or 13 which is characterized in that the aforesaid core material has a rib which extends in the radial direction of the structure.

Claim 15 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 3 to 6 and 11 to 14 which is characterized in that the aforesaid core material comprises a foam.

Claim 16 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 3 to 6 and 11 to 15 which is characterized in that a groove is formed in the surface of the aforesaid core material.

Claim 17 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 16 which is characterized in that a liner is provided in at least one part of the inner face of the aforesaid main body portion.

Claim 18 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 17 which is characterized in that the aforesaid liner has a plurality of concave grooves.

Claim 19 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 18 which is characterized in that the aforesaid reinforcing fibre is at least one type from amongst carbon fibre, glass fibre, aramid fibre, high density polyethylene fibre and polyarylate fibre.

Claim 20 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 19 which is characterized in that the aforesaid reinforcing fibre comprises carbon fibre tow, where one tow has a number of single filaments in the range 12,000 to 200,000.

Claim 21 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 20 which is characterized in that the void content of the aforesaid main body portion lies within the range 2% and below, by volume.

Claim 22 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 21 which is characterized in that the aforesaid synthetic resin is at least one type from amongst epoxy resins, unsaturated polyester resins, vinyl ester resins and phenolic resins.

Claim 23 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 22 which is characterized in that a covering layer is integrally formed at the outer face of the main body portion.

Claim 24 (withdrawn) A fibre-reinforced plastic structure with a hollow section according to Claim 23 which is characterized in that the covering layer is a gel coat layer.

Claim 25 (withdrawn) Transport modes characterized in that they have, as part thereof, a fibre-reinforced plastic structure with a hollow section according to any of Claims 1 to 24.

Claim 26 (currently amended) A method for the production of a ~~fibre~~ fiber- reinforced plastic (FRP) structure with a hollow section, comprising: which is characterized in that it proceeds via at least the following stages in turn:

(A) An providing an inner mould-mold having a non-circular sectional shape, wherein the preparation stage in which an inner mould-mold of cross-section having a non-circular sectional shape is positioned on a stand,

(B) A arranging a substrate arrangement-stage in which substrate comprising, in part or in total whole, a reinforcing fibre fiber, wherein the substrate is arranged at the surface of the aforesaid inner mould-mold such that the reinforcing fiber does not extend continuously for two or more laps of a circumference of the inner mold,

(C) A pressure reduction stage in which the top covering an outer periphery of the aforesaid substrate is covered with a bag and reducing the an interior pressure of within said bag is reduced to below atmospheric pressure, and

(D) ~~A impregnating a synthetic resin impregnation stage in which synthetic resin is injected into the aforesaid reinforcing fibre and the interior of the substrate is impregnated by uniform diffusion of said resin in the reinforcing fibre substrate, face direction~~

Claim 27 (currently amended) A method for the production of a ~~fibre~~ fiber- reinforced plastic structure with a hollow section according to ~~Claim-claim~~ 26, ~~which is characterized in that~~ wherein the entire FRP structure is also cured within the temperature range 50 to 200°C, and integral moulding effected.

Claim 28 (currently amended) A method for the production of a ~~fibre~~ fiber- reinforced plastic (FRP) structure with a hollow section, comprising: which is characterized in that it proceeds via at least the following stages in turn.

(A) ~~An providing an inner mould-mold having a non-circular sectional shape, wherein the preparation stage in which an inner mould-mold of cross-section having a non-circular sectional shape is positioned on a stand,~~

(B) ~~A arranging a substrate arrangement stage in which substrate comprising, in part or in total whole, a reinforcing fibre fiber, wherein the substrate is arranged at the surface of the aforesaid inner mould-mold such that the reinforcing fiber does not extend continuously for two or more laps of a circumference of the inner mold,~~

(C) ~~An arranging an outer mould-mold, wherein an arrangement stage in which the outer periphery of the aforesaid reinforcing fibre-arranged substrate is covered with an the outer mould mold,~~

(D) ~~A pressure reduction stage in which the~~ reducing a pressure is reduced between the aforesaid outer ~~mould~~ mold and the inner ~~mould~~ mold, and

(E) ~~A impregnating a synthetic resin impregnation stage in which synthetic resin is injected into the aforesaid reinforcing fibre and the interior of the substrate is impregnated by uniform diffusion of said resin in the reinforcing fibre substrate, face direction~~

Claims 29-31 (canceled)

Claim 32 (currently amended) ~~A method for the production of a fibre reinforced plastic structure with a hollow section according to Claims 28, 29 or 31 which is characterized in that, in the aforesaid inner mould arrangement stage (A), of claim 28, further comprising~~ pressurizing the inner mould ~~interior is pressurized with a fluid and said inner mould made to expand in the outer mould direction.~~

Claim 33 (currently amended) ~~A method for the production of a fibre~~ fiber ~~reinforced plastic structure with a hollow section according to of Claim~~ claim 32, wherein ~~which~~ is characterized in that, in the aforesaid inner mould ~~mold~~ preparation stage (A), the fluid used for pressurizing the interior of the inner mould ~~mold~~ is compressed air and the applied at a pressure thereof lies within the a range 0.049 to 0.98 MPa (0.5 to 10 kg/cm²G).

Claim 34 (currently amended) ~~A method for the production of a fibre reinforced plastic structure with a hollow section according to Claims 26 to 33 which is characterized in that, in the aforesaid inner mould preparation stage (A), there is employed an~~ of claim 28, wherein the inner mold ~~mold~~ having has resin channel grooves in the an outer face and the synthetic resin is injected into the reinforcing fibre substrate ~~from~~ through said grooves.

Claim 35 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 29 to 34 which is characterized in that, in aforesaid substrate arrangement stage (B), there is employed a resin diffusion medium which enables the resin to diffuse into the aforesaid covering material~~ of claim 28, wherein a resin diffusion medium is located between the inner mold and the substrate.

Claim 36 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to Claim 35 which is characterized in that there is used a reticulate material as the aforesaid resin diffusion medium~~ of claim 35, wherein the resin diffusion medium is a reticulate material.

Claim 37 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 26 to 36 which is characterized in that there is used a plastic, a rubber material, a water-soluble polymer material or a wood material as the aforesaid inner mould~~ of claim 28, wherein the inner mold comprises a material selected from the group consisting of a plastic, a rubber material, a water-soluble polymer material and a wood material.

Claim 38 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 26 to 37 which is characterized in that like aforesaid structures are mutually joined~~ of claim 28, wherein the FRP structure is held together by a local vacuum mould-molding method to form a single body.

Claim 39 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 26 to 38 which is characterized in that, in the aforesaid substrate arrangement stage (B), when~~ of claim 28, wherein the arranging the substrate comprising reinforcing fibre there is used, comprises securing the substrate with a

~~retainer between substrates or between the substrate and inner mould a substrate retainer which secures the substrate.~~

Claim 40 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 26 to 39 which is characterized in that there is used an inner mould which is moulded as a hollow body by means of the blow moulding method~~ of claim 28, wherein the inner mold is a hollow body made by blow molding.

Claim 41 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 26 to 40, which is characterized in that it has an inner mould removal stage in which~~ of claim 28, further comprising removing the inner mould ~~mold is removed from the integrally moulded FRP structure.~~

Claim 42 (currently amended) A method ~~for the production of a fibre reinforced plastic structure with a hollow section according to any of Claims 26 to 40 which is characterized in that~~ of claim 28, wherein the inner mould ~~mold is integrally coupled to the FRP structure and left within the integrally moulded FRP structure.~~

Claim 43 (currently amended) A method for the production of a plurality ~~(sic)~~ of ~~fibre hollow structures of fiber-reinforced plastic structures with hollow sections which is characterized in that, it is a method for the production of a fibre reinforced plastic structure composed of~~ comprising a plurality of mould-molded elements, at least one of which moulded the molded elements is made by the method of claim 28 and has a section which constitutes a solid of non-revolution non-circular shape and which is provided with at least one opening and with having a main body portion having a cavity in the interior, and when the method comprising joining together the aforesaid mould-molded elements, by arranging the reinforcing fibre fiber is

~~arranged spanning across the region of join formed by a joint between the mould-molded elements, and covering the regions of join are locally covered joint~~ with bags, ~~from above the reinforcing fibre, after which the reducing a pressure inside the bags, is reduced and injecting resin-injected, and causing impregnation effected, so that the mould-molded elements are to be~~ mutually connected together.

Claims 44-45 (canceled)

Claim 46 (new) A method of claim 28, wherein the impregnated resin is cured within the temperature range 50 to 200°C.

Claim 47 (new) A method of claim 34, wherein the depth of the groove is 1 to 50 mm.

Claim 48 (new) A method of claim 34, wherein the pitch of the groove is 5 to 900 mm.

Claim 49 (new) A method of claim 34, wherein the width of the groove is 3 to 5 mm.

Claim 50 (new) A method of claim 28, wherein the substrate is selected from the group consisting of a unidirectional preform, a woven material, a mat and combinations thereof.